

September 1993

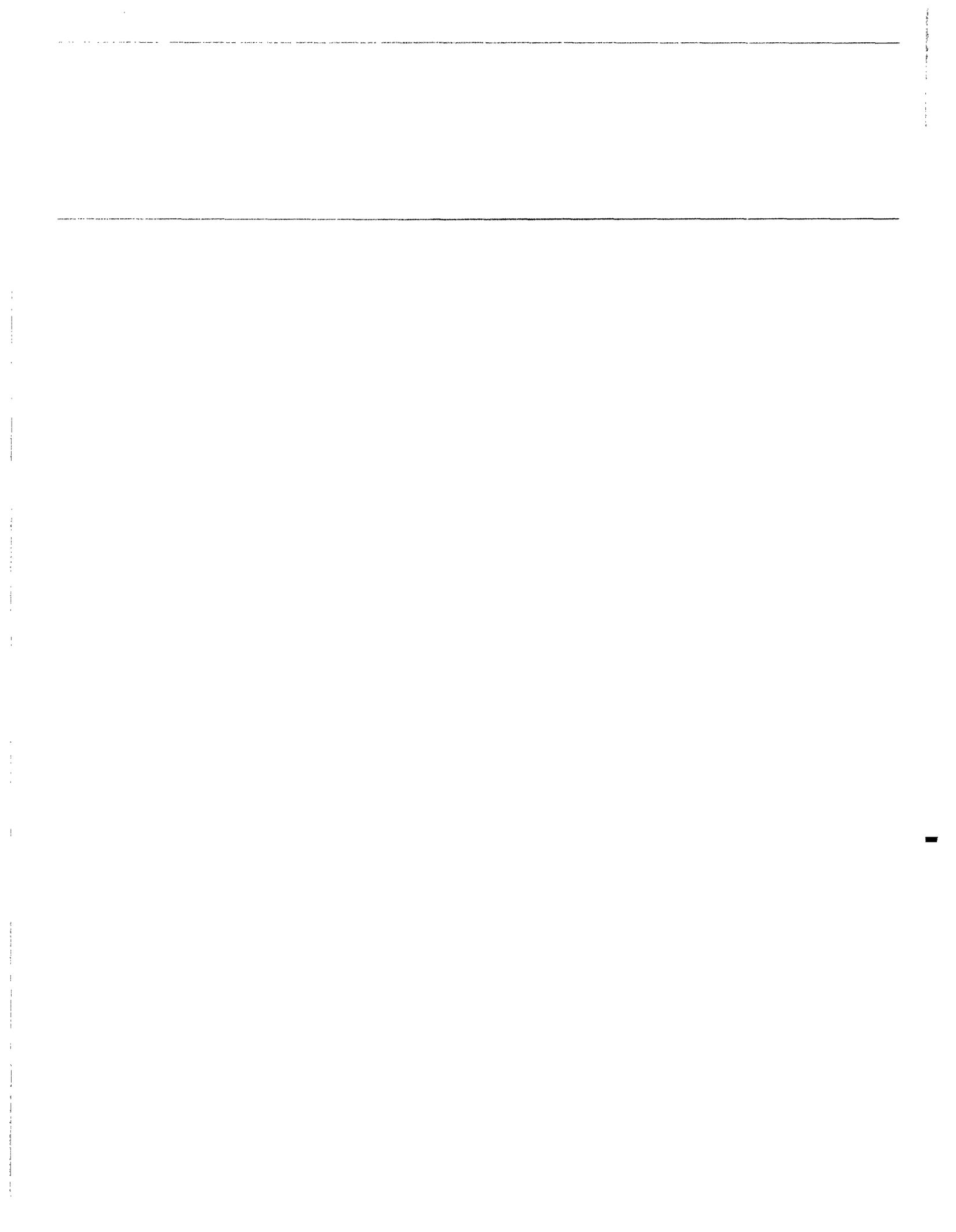
PROTECTED SPECIES

Marine Mammals' Predation of Varieties of Fish



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Resources, Community, and
Economic Development Division

B-254186

September 10, 1993

The Honorable Slade Gorton
United States Senate

Dear Senator Gorton:

As you know, the Congress is considering the reauthorization of two major species protection laws—the Marine Mammal Protection Act (MMPA)¹ and the Endangered Species Act (ESA).² In this context, you raised concern about the predation of steelhead³ by California sea lions, protected under the MMPA, which is occurring at the Ballard Locks⁴ in Seattle, Washington. You asked us to examine the impacts of species protected by the MMPA and ESA on species not protected by these laws.

In response to your request and as agreed with your office, we obtained information on (1) instances in which predation by an MMPA- or ESA-protected species was threatening the existence of another species and (2) any efforts being undertaken to address such adverse predation. You also asked for our comments on the use of federal agencies' authorities under these laws to resolve adverse predation by protected species. The Department of Commerce's National Marine Fisheries Service (NMFS) and the Department of the Interior's U.S. Fish and Wildlife Service (FWS) have primary responsibility for administering the MMPA and ESA. This letter provides the results of our work.

Results in Brief

According to NMFS and FWS officials, the predation occurring at the Ballard Locks by California sea lions is the only documented instance in which predation by a protected species is threatening the existence of another species. However, at two other locations—the Columbia River and the state of Maine—federal officials believe that the adverse predation of fish by protected sea lions or seals may also be occurring, although the extent of predation has not been confirmed.

Efforts to mitigate predation have been taken at the Ballard Locks. The efforts, undertaken by federal and state agencies, have included relocating

¹16 U.S.C. 1361 et seq.

²16 U.S.C. 1531 et seq.

³Steelhead are a species of anadromous fish in the salmon family.

⁴These locks are officially named the Hiram M. Chittenden Locks.

the sea lions and employing means to drive them away from the locks; but the efforts have been unsuccessful. Other possible options that have been identified include temporarily capturing and holding the sea lions during the migration of steelhead and making structural changes to the locks and accompanying spillway. Finally, NMFS has considered taking stronger action (lethal removal) to control the sea lion population, but concluded that the MMPA's provisions do not authorize the use of lethal measures at this time to resolve the Ballard Locks predation situation.

The potential adverse predation in the Columbia River involves the predation of ESA-protected salmon by MMPA-protected sea lions and harbor seals. Should this predation be confirmed as posing a threat to the salmon, it is not clear how the authorities contained in these two laws would be used to resolve the predation.

Background

The MMPA was enacted in 1972, at a time when the populations of certain marine mammal species were in serious decline. With few exceptions, the MMPA placed a moratorium on "taking" (harassing, hunting, capturing, or killing) marine mammals. The act was most recently reauthorized in 1988, and its current authorization expires this year.

The MMPA's stated goal is to restore and maintain marine mammal species and population stocks to their "optimum sustainable population." The MMPA defines optimum sustainable population as the number of animals within any population stock that will result in the maximum productivity of the population or the species, taking into account the carrying capacity of the habitat and the health of the ecosystem in which the species lives.

Since the MMPA's enactment, some marine mammal populations have grown, while others have not. For example, a 1992 NMFS report noted that the estimated West coast population of 180,000 California sea lions may be higher than any known historical level.⁵ However, other marine mammals, such as the West Indian manatee, Hawaiian monk seal, and some species of whales, are still at perilous levels and have been listed as endangered or threatened species under the ESA.⁶

⁵Prior to the MMPA's enactment, California sea lions were killed for their oil, pelts, hides, and other products until the late 1930s and were subject to bounty hunting in Oregon and Washington State until the early 1960s.

⁶An endangered species is any species at risk of extinction in all or a significant portion of its range, whereas a threatened species is one that is likely to become endangered in the foreseeable future in all or a significant portion of its range.

Passed in 1973, the ESA's goal is to restore species so that they can live in self-sustaining populations without the act's protection. Unlike the MMPA, the ESA does not call for achieving optimum sustainable populations of protected species but, instead, aims at preventing the extinction of protected species. The ESA provides for the development of recovery plans for all species determined to be endangered or threatened, unless such plans would not benefit the species. The goal of such plans is to restore species so they can live as viable self-sustaining components of their ecosystems. When this goal is met, the species can be removed from the ESA's protection, referred to as delisting.⁷

NMFS and FWS share administrative responsibility for the two acts. For the MMPA, NMFS is responsible for species of whales, dolphins, porpoises, seals, and sea lions. FWS is responsible for the walrus, sea and marine otters, polar bear, manatee, and dugong.⁸ For the ESA, FWS is responsible for protecting freshwater and land species, and NMFS is responsible for protecting most marine and anadromous species.

Few Instances of Actual or Potential Adverse Predation by Marine Mammals

NMFS and FWS officials have identified instances at three locations of actual or potential predation of another species by a protected species. Each of these instances involves seals or sea lions, protected under the MMPA, preying on species of fish.⁹ The three instances vary greatly in the degree to which predation has been documented.

Predation of Steelhead Runs by Sea Lions at Seattle's Ballard Locks

Completed in 1916, the Ballard Locks provide passage between Puget Sound and two freshwater lakes (Lake Union and Lake Washington). An adjacent fish passage facility allows migrating fish, including steelhead, to return from the ocean to freshwater spawning grounds. While male California sea lions wintering in the Puget Sound area had been observed feeding on returning steelhead at the locks as early as the 1970s, a predation problem did not come to public attention until the 1980s, when one or two sea lions feeding on steelhead were periodically observed.

⁷If a marine mammal that had been listed under the ESA were delisted, it would continue to be protected under the MMPA, as the MMPA does not contain any listing or delisting provisions.

⁸A dugong is an aquatic mammal related to the manatee.

⁹According to FWS officials, predation by an ESA-protected species is less likely because populations of ESA-protected species are generally too small to have a significant predatory impact on other species.

In 1985, Washington state officials noted serious declines in steelhead runs at the Ballard Locks, and counts of steelhead passing through the locks' fish passage facility showed that by 1991, the Washington State Department of Wildlife's goal of having 1,600 wild steelhead¹⁰ returning to the spawning grounds had not been attained for 6 of the previous 7 years. By 1992, NMFS concluded that as many as 30 to 60 sea lions were consuming almost 60 percent of the winter run of wild steelhead and that one to three sea lions were responsible for most of this predation. In July 1993, the Washington Department of Wildlife told us that the number of steelhead successfully returning through the Ballard Locks to their spawning grounds had fallen to fewer than 200.

Predation of Salmon Runs by Sea Lions and Harbor Seals in the Columbia River

Declining populations of certain wild salmon species in the Columbia River and its major tributary, the Snake River, led NMFS to list the Snake River sockeye salmon as an endangered species in November 1991 and certain runs of Snake River chinook salmon, including the spring runs, as a threatened species in May 1992. Also, increasing populations of seals and sea lions, protected under MMPA, have been inhabiting areas within the Columbia River Basin, and California sea lions have been sighted in upriver areas—an occurrence for which there is no historical documentation.

Although dams on the Columbia and Snake Rivers are considered to be the primary factors in the decline of the currently protected salmon runs, other factors, including predation by sea mammals, are also believed to have contributed to the decline. According to a 1990 NMFS report,¹¹ an estimated 40 to 50 percent of the returning adult spring chinook salmon at Lower Granite Dam on the Snake River had teeth marks caused by marine mammal attacks, believed by NMFS to be teeth marks left by harbor seals or California sea lions. Where the attacks took place or how many fish may have been killed prior to their arrival at Lower Granite Dam was not known.

NMFS is currently in the process of developing recovery plans for the threatened and endangered Snake River salmon species. As part of this process, NMFS has attempted to determine the seriousness of predation of

¹⁰Wild runs of fish are genetically unique populations that have maintained reproduction successfully without supplementation from hatcheries.

¹¹J. Harmon and G. Matthews, Evidence of Increase in Marine Mammal Damage to Adult Spring Chinook Salmon in Columbia River, Northwest and Alaska Fisheries Centers Quarterly Report, April-May-June 1990.

salmon by analyzing existing information from a variety of sources, including observations made at fish passage facilities through Columbia and Snake River dams and hatcheries, and during commercial and sport fishing activity. In May 1993, a draft NMFS report based on this analysis concluded that a potentially serious predation problem caused by marine mammals may be occurring, but the degree to which such predation has contributed to the decline of the salmon runs could not yet be determined. NMFS has called for further studies to better assess the effect of predation.

Predation of Salmon Runs by Harbor Seals in Several Maine Rivers

NMFS and state of Maine officials have identified the possibility of a predation problem caused by protected species in five Maine rivers—the Narraguagus, Dennys, Machias, East Machias, and Pleasant. Runs of wild North Atlantic salmon in these rivers have declined in the past decade to levels that FWS and the Atlantic Sea Run Salmon Commission, a state agency, consider dangerously low.¹² While the primary reason for the decline has been identified as the salmon's low rate of survival while in the ocean, the commission believes that predation by harbor seals may also be a factor on the basis of reports from fishermen and local residents, who have observed increased predation of Atlantic salmon by harbor seals in recent years.

Research on the extent of the predation of Atlantic salmon by harbor seals has not yet been conducted. In 1987, FWS and the state of Maine asked NMFS to conduct such research; but NMFS declined, citing a lack of funds. Again, in October 1992, FWS and the commission called for NMFS research to identify and monitor the reasons for the declining Atlantic salmon populations. According to FWS and NMFS officials, neither agency has plans to conduct this research, because limited funds are being used for other research in these rivers.

Unsuccessful Efforts to Resolve Adverse Predation

Of the three instances in which predation is or may be a problem, only at the Ballard Locks have actions been attempted to control predation by sea lions. The actions have been taken by federal and state agencies and have included a variety of nonlethal harassment techniques to keep the sea lions from the lock area. The actions, however, have been ineffective. Other possible options include capturing and holding the sea lions while the steelhead are present or making structural changes to the locks and accompanying spillway. NMFS has also considered lethal alternatives, but

¹²Runs in two additional rivers—the Sheepcot and Duck Trap—may also be at low levels, according to state officials.

while the MMPA contains authority for the lethal removal of marine mammals in certain circumstances, NMFS has concluded that this authority does not apply to the current situation at the Ballard Locks.

Ineffective Actions Taken at Ballard Locks

Since 1985, NMFS has cooperated with the Washington Department of Wildlife, the U.S. Army Corps of Engineers (which operates the Ballard Locks), and Indian tribes¹³ to try to control predation by sea lions and increase the number of returning wild steelhead. These efforts to address the predation were taken pursuant to section 109(h)(1)(C) of the MMPA, which allows for nonlethal removal of nuisance mammals. Added to the MMPA in 1981, this provision has been used successfully in other Puget Sound locations to remove California sea lions from ferry docks by building fences and to chase them away from federal salmon research facilities.

Initial attempts to remove sea lions from the Ballard Locks involved detonating underwater firecrackers. This attempt resulted in some initial success but declined in effectiveness as sea lions became accustomed to the noise. NMFS and other agencies also tried capturing sea lions in nets, feeding sea lions dead steelhead injected with chemicals to make the fish taste bad, and building barrier nets to keep the sea lions away from the locks. However, none of these techniques were effective.

In 1989, NMFS tried a more extensive approach—capturing and relocating the sea lions. Of the 37 sea lions captured and relocated 270 nautical miles away to Washington's outer coast, 29 returned to Puget Sound. Some of the sea lions were relocated two and three times but continued to return. In 1990, NMFS relocated six sea lions even further south to their breeding area off the southern California coast. However, three of the six returned—one in 30 days, the two others in about 45 days. A fourth sea lion returned as far north as the Columbia River before turning around.

The most recent attempts to control the sea lions occurred during the winter of 1992-93, when underwater "acoustic deterrent devices," producing periodic uncomfortable sound pulses, were installed near the locks. These were improved versions of noise-producing devices that had previously proved ineffective. As before, the sea lions were initially driven away but quickly accustomed themselves to the sounds.

¹³The Muckleshoot and Suquamish tribes have treaty fishing rights to a share of the Lake Washington wild steelhead run.

Currently, water salinity studies and behavioral studies of steelhead are under way to better understand their movement through the locks. However, Washington State and NMFS regional biologists told us they were unsure of what additional steps, if any, would be taken. The Director of NMFS' Office of Protected Resources expressed optimism that options not yet fully explored may solve the problem without the need to consider lethal alternatives, if funding resources can be made available. One option not yet tried would involve temporarily capturing the sea lions when the steelhead are present and then releasing them afterwards. This option would entail some risk of injuring the sea lions during capture, the expense of constructing a holding facility for the sea lions, and caring for and feeding them for up to 6 months while in captivity.

Work has also been undertaken to study possible structural changes to the locks and accompanying spillway. In 1990, an interagency technical committee was convened, comprising representatives from NMFS, the Washington Department of Wildlife, and the Corps of Engineers. The committee did not recommend any structural modifications but did recommend that fish passage studies be conducted and that water spill patterns be modified. The spill pattern was modified in response. Lighting experiments have also been conducted to enhance the night-time passage of steelhead through the locks. But according to NMFS, test results were inconclusive because of technical problems and insufficient numbers of returning fish to validate the test.

Nonapplicable Authority for Lethal Taking at the Ballard Locks

Faced with a lack of success in using nonlethal methods to discourage sea lions from remaining at the locks, NMFS has also examined the legality of using lethal removal methods. Washington State and NMFS regional biologists we interviewed believe that lethal removal of selected animals could be effective and would discourage remaining sea lions from staying in the area. Furthermore, a 1989 NMFS study concluded that "the lethal removal of small numbers of male sea lions would have no [detrimental] impact on the population of over 177,000 animals, especially in view of the increasing population trend."

With regard to NMFS' authority to remove sea lions by a lethal method, section 109 (h)(1)(B) of the MMPA provides for lethal taking for "the protection of the public health and welfare." This section has been cited, for example, to permit the removal of sick or diseased mammals from public beaches. NMFS examined whether the authority granted by the section extended to situations like that at the Ballard Locks but has

concluded that it did not have the authority and that the Congress did not intend the section to apply in such instances.

Another section of the act (sec. 101(a)(3)(A)) allows the Secretary of Commerce to issue a waiver that would permit the lethal taking of nuisance animals but not until the population reaches its optimum sustainable population. However, NMFS officials have not determined that the population has reached optimum sustainable population as defined by the act and NMFS' regulations. According to an April 1992 NMFS report, the rate of population growth has been about 6 percent a year, indicating a continued potential for absorbing additional numbers of sea lions within their habitat. A substantial slowing of the growth rate, according to these officials, would be a possible indication that the sea lion population was at or past its optimum level. In addition, even if NMFS concluded that the sea lion population had reached optimum sustainable levels, obtaining a waiver to allow for lethal takings is not automatic and would not be accomplished without a potentially lengthy and contentious process of obtaining public comments on the waiver proposal.

MMPA's and ESA's Authorities to Resolve Predation of Species

Federal and state agencies' attempts to resolve predation by sea lions at the Ballard Locks have been undertaken on the basis of authorities contained in the MMPA. To date, these authorities, which permit limited nonlethal human intrusion into predation conflicts, have not resulted in the successful resolution of predation by sea lions. Furthermore, the MMPA's existing authorities for the lethal taking of marine mammals not at optimum sustainable populations, according to NMFS, are intended to resolve conflicts between the protected species and human activity, not to resolve instances in which a protected species threatens the survival of an unprotected species.

The predation of steelhead by sea lions at the Ballard Locks was a topic of discussion when a group of over 30 organizations representing both conservation and fishing interests held a series of meetings earlier this year to discuss reauthorization issues concerning the MMPA. The goal of the meetings was to develop proposed amendments to the MMPA and reach a consensus on specific language that all the organizations could support. To address predation by marine mammals, such as that at the Ballard Locks, the group developed proposed language amending the MMPA that would allow NMFS to consider lethal removal of seals and sea lions when they are identified as habitually exhibiting dangerous or damaging behavior that cannot otherwise be deterred. However, only 13 of the

organizations, including both fishing and conservation organizations, endorsed the specific language of this proposal, which may reflect the difficulty in reaching consensus on how to effectively address instances of predation by marine mammals.¹⁴

In July 1993, legislation (H.R. 2760) to amend the MMPA was introduced in the House of Representatives. The legislation incorporated many of the suggestions made by the organization of fishing and conservation interests, as well as concerns expressed by NMFS, the Marine Mammal Commission, and other organizations. To deal with predation by marine mammals, the bill would require the Secretary of Commerce to establish a task force to determine the extent, if any, to which seals and sea lions are affecting salmon stocks.

The case of possible adverse predation by marine mammals on Columbia River salmon, which are protected under the ESA, could lead to a situation even more difficult to resolve. Should the predation of ESA-protected salmon species in the Columbia River by sea lions and harbor seals be documented as a threat to these species, NMFS will have to determine how to protect the salmon under provisions of the ESA and at the same time comply with the MMPA's provisions for protecting the marine mammals. It is unclear to us how the authorities under the MMPA and the ESA would be applied to resolve this potential adverse predation situation.

Agency Comments

We discussed the information contained in this report with responsible officials of the major agencies involved, including headquarters representatives of FWS' Division of Endangered Species, Office of Management Authority, and Division of Fish and Wildlife Management Assistance; NMFS' Office of Protected Resources; and regional FWS and NMFS representatives. These officials generally agreed with the factual information presented, and on the basis of their comments, we made changes as appropriate. As agreed with your office, we did not obtain written comments on a draft of this report from the agencies and organizations we contacted.

Scope and Methodology

To obtain information on the extent to which species protected under the ESA and MMPA were adversely affecting nonprotected species, we held discussions with NMFS and FWS headquarters and regional officials. We also

¹⁴An official involved in these meetings informed us that other groups would have supported the lethal taking provision, but their concurrence was not obtained because of time constraints.

met with officials of the Washington State Department of Wildlife and the State of Maine Atlantic Sea Run Salmon Commission and discussed predation issues with officials of the Pacific States Marine Fisheries Commission, the Center for Marine Conservation, the Marine Mammal Commission, and the Northwest Indian Fisheries Commission. We conducted our review between January and July 1993 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will make copies available to the Secretary of Commerce, the Secretary of the Interior, and other interested parties. We will also make copies available to others on request.

Please contact me on (202) 512-7756, if you or your staff have any questions. Major contributors to this report are listed in appendix I.

Sincerely yours,

A handwritten signature in cursive script that reads "James Duffus III". The signature is written in black ink and is positioned above the typed name.

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